FIG. 1

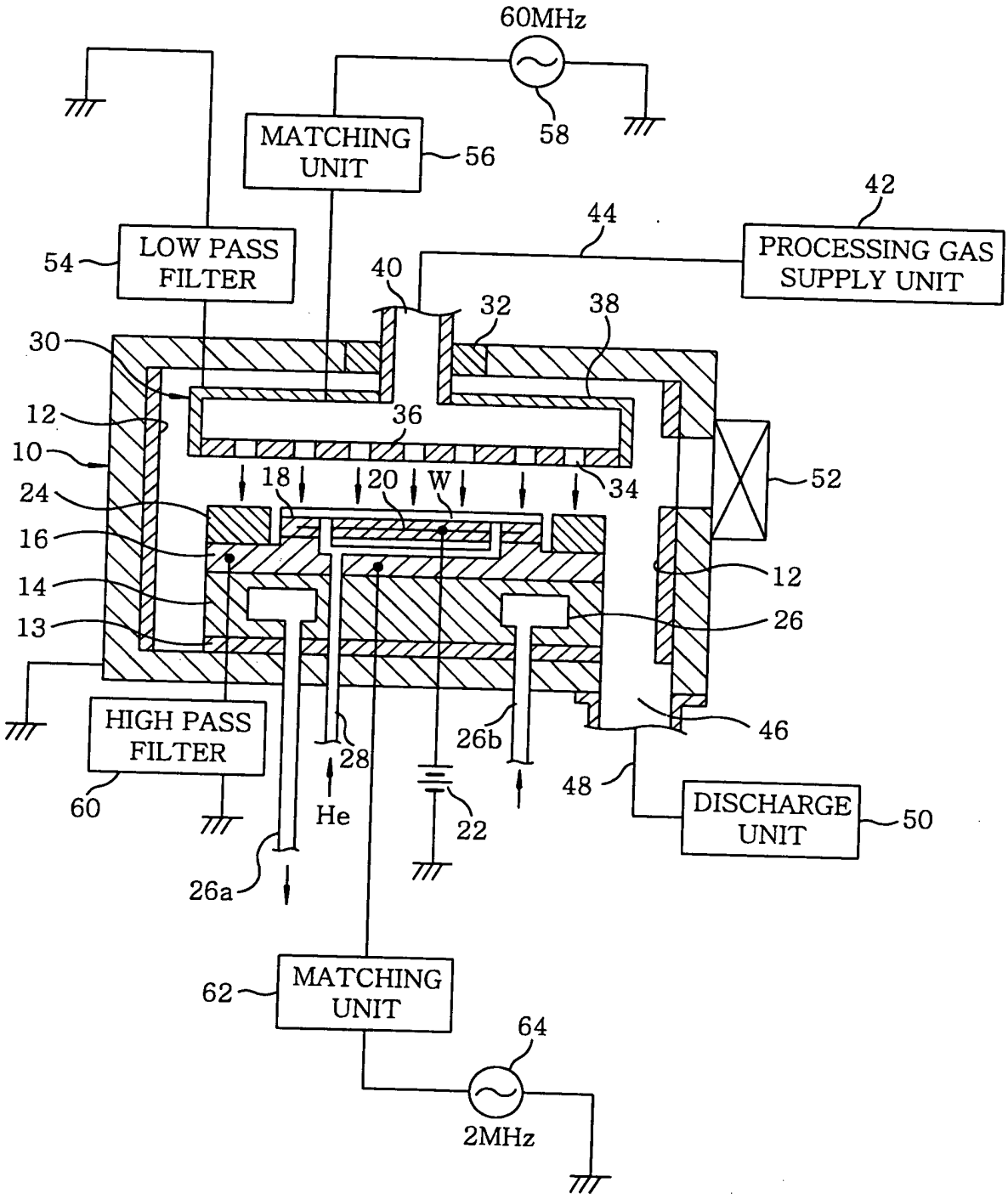

60MHz
58
MATCHING UNIT
56
42
44
PROCESSING GAS SUPPLY UNIT
54
LOW PASS FILTER
40
32
38
30
12
36
10
18
20
W
34
52
24
16
12
14
26
13
HIGH PASS FILTER
46
26b
28
48
60
He
22
DISCHARGE UNIT
50
26a
62
MATCHING UNIT
64
2MHz

FIG. 2

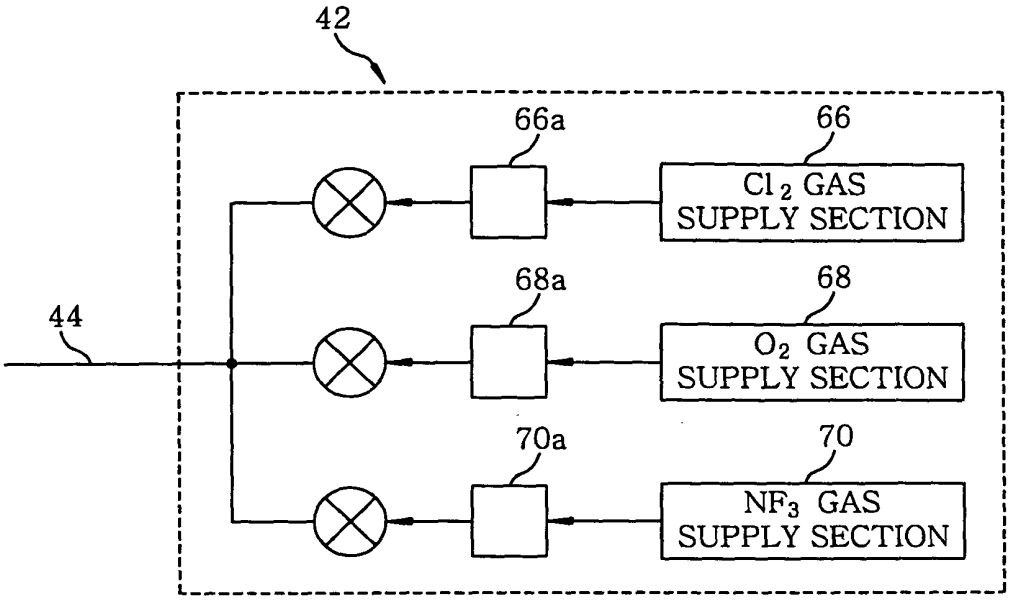

42
66a
66
Cl_2 GAS SUPPLY SECTION
68a
68
44
O_2 GAS SUPPLY SECTION
70a
70
NF_3 GAS SUPPLY SECTION

FIG.3

	Cl_2 (sccm)	O_2 (sccm)	NF_3 (sccm)	TOTAL FLOW RATE (sccm)	Cl_2+O_2 (sccm)	O_2 ratio (O_2/Cl_2+O_2)	RESIDENCE TIME (msec)	TAPER ANGLE (deg.)	Si E/R (μm/min)	SELECTIVITY (Si/SiO_2)
EXAMPLE 1	16	4	20	40	20	0.20	428.2	89.3	0.81	—
EXAMPLE 2	19	6	20	45	25	0.24	380.6	89.0	0.81	28.70
EXAMPLE 3	20	5	20	45	25	0.20	380.6	89.2	0.78	—
EXAMPLE 4	65	15	20	100	80	0.19	171.3	87.6	1.01	—
EXAMPLE 5	85	20	20	125	105	0.19	137.0	87.5	0.78	—
EXAMPLE 6	110	30	20	160	140	0.21	107.0	87.7	0.78	—
EXAMPLE 7	130	30	20	180	160	0.19	95.1	87.8	0.80	—
EXAMPLE 8	145	15	20	180	160	0.09	95.1	91.8	1.20	—

FIG. 4

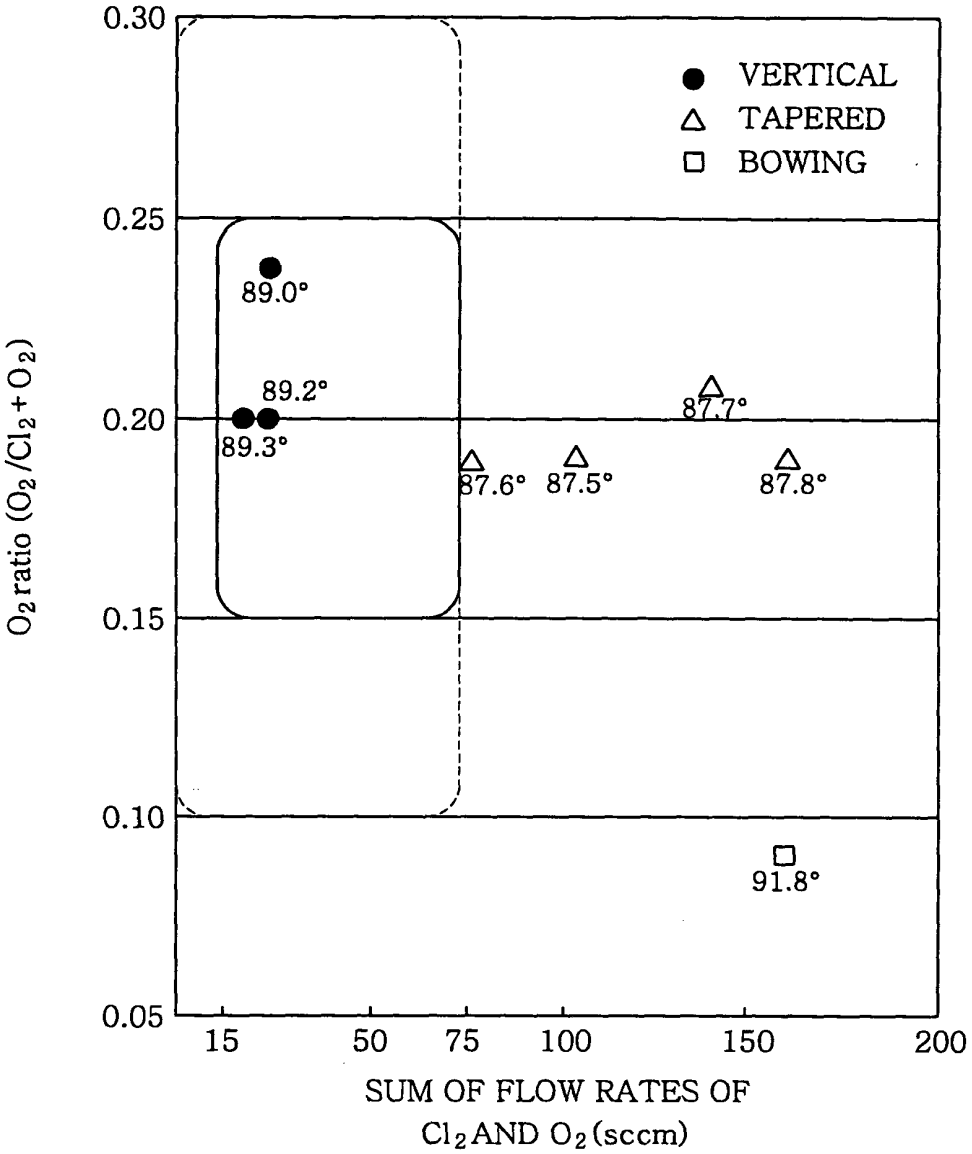
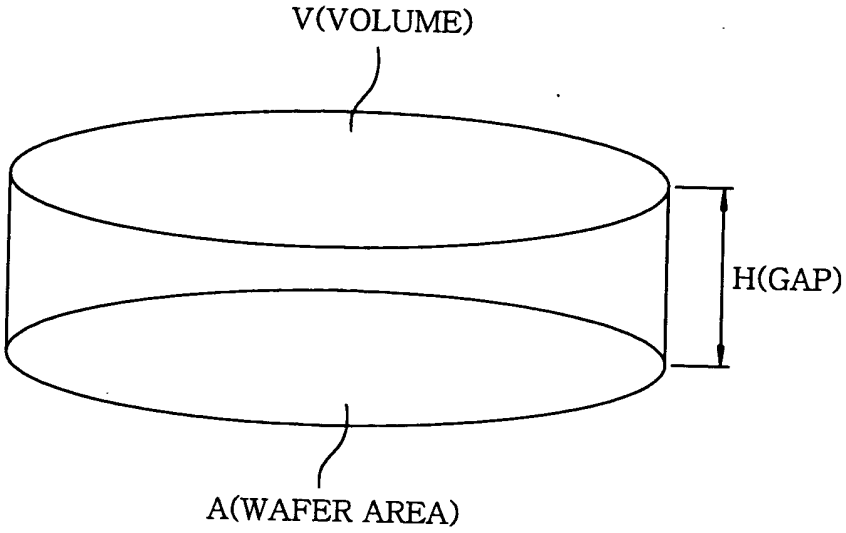

0.30
0.25
0.20
0.15
0.10
0.05
VERTICAL
TAPERED
BOWING
89.0°
89.2°
89.3°
87.6°
87.5°
87.7°
87.8°
91.8°
15
50
75
100
150
200
O_2 ratio (O_2/(Cl_2+O_2))
SUM OF FLOW RATES OF
Cl_2 AND O_2 (sccm)

FIG.5

	HBr (sccm)	O_2 (sccm)	NF_3 (sccm)	HBr+ O_2 (sccm)	O_2 ratio (O_2 /HBr+ O_2)	TAPER ANGLE (deg.)	Si E/R (μm/min)
COMPARATIVE EXAMPLE 1	100	1	24	101	1%	92.3	0.26
COMPARATIVE EXAMPLE 2	100	1	0	101	1%	87.5	0.24

FIG. 6

$V = A \cdot H$



$\tau = V/S = PV/Q$

τ : RESIDENCE TIME (s)
V : EFFECTIVE ETCHING VOLUME (=AxH) (l)
S : EXHAUST RATE OF ETCHING GAS (l/s)
A : WAFER AREA
H : ELECTRODE GAP
P : PATIAL PRESSURE (torr) OF ETCHING GAS
Q : TOTAL FLOW RATE (torr • l/s) OF ETCHING GAS